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An unfortunate result of the contrary view held by the two authors is that *Pongo* Lacép. (1799) takes the place of *Simia* for the orang. Unfortunate, for however much the proper use of this word has been confused by later authors, old Andrew Battell, in 'Purchas' made it clear that the native name *pongo* belongs to the gorilla, and while it is true that some of the codes now in use do not consider that grievous misapplication in meaning is cause for removal, it may be doubted if any rule which serves to perpetuate error in fact stands on a lasting base where scientific exactness is the object.

Simia satyrus being transferred to a species of chimpanzee, the proper name for the orang, according to Mr. Rothschild (p. 421), is *Pongo pygmæus* (Linn.). The paper of Linnæus's understudy, Hoppius, in the 'Amœnitates Academicæ' (1763), which is the reliance for this, is not really binominal and should not be considered. The first available use of *pygmæus* is in Schreber (1796), where it is based on Tyson's excellent figure of a chimpanzee. This is adopted by Rothschild for one of the chimpanzees, as *Simia pygmæa* (Schr.); the orang being *Pongo pygmæus* (Linn.)—an ill-judged and indefensible confusion.

All these lamentable changes may be avoided by the manner of treatment I have suggested, which appears to me to be quite within the rules. Present synonymy will be undisturbed and an appalling amount of confusion will be escaped. How great this is will be seen on attempting to correlate Mr. Rothschild's nomenclature with some known species. The only change required is that *Pan* Oken (1816) seems necessary for the chimpanzee, but this does not entail any alteration in specific names.

If it is to be regretted that Mr. Rothschild (p. 421) has followed Matschie so closely as to continue the erroneous date of '*Satyrus* Lesson, 1799'—which should be 1840—it is, at least, unalloyed gratification to be assured (p. 440) that the distinguished author and patron of zoological science is prepared to lead con-

tinental and American zoologists in the campaign for a system of pure trinomials.

ARTHUR ERWIN BROWN.

ZOOLOGICAL GARDENS, PHILADELPHIA,
May 27, 1905.

SCIENTIFIC JOURNALS AND ARTICLES.

The American Naturalist for June contains the following articles:

E. W. BERRY: 'Fossil Grasses and Sedges.'

H. W. RAND and J. L. ULRICH: 'Posterior Connections of the Lateral Vein of the Skate.'

H. W. RAND: 'The Skate as a Subject for Classes in Comparative Anatomy; Injection Methods.'

T. H. ROMEISER: 'A Case of Abnormal Venous System in *Necturus maculatus*.'

R. H. HOWE, JR.: 'Sir Charles Blagden, earliest of Rhode Island Ornithologists.'

C. R. EASTMAN: 'The Literature of Edestus.'

SOCIETIES AND ACADEMIES.

THE BOTANICAL SOCIETY OF WASHINGTON.

THE twenty-ninth regular meeting of the Botanical Society of Washington was held at the Portner Hotel, May 27, 1905. The following papers were presented:

Evolutionary Status of the Laminariaceæ:

WALTER T. SWINGLE.

Mr. Swingle's paper was illustrated by specimens from the algal herbarium of Mrs. W. T. Swingle. It was pointed out that of the twenty-two genera belonging to the true Laminariaceæ (*Corda* and *Adenocystis* being excluded) twelve (or over one half) are limited to the Pacific coast of the United States, from Lower California to British Columbia. In all, sixteen genera occur within these limits, while two more occur in Alaska and one more in New England, making nineteen genera in all from the United States territory in North America, or *over four fifths of the known genera*. In this territory there are fifty-one species, or almost exactly half of the one hundred and five species now known from the whole world.

The Laminariaceæ were shown to be cold-water algæ and are limited in their distribution chiefly by the summer temperatures of the sea water. The family originated in the

northern Pacific Ocean, or at least here was where their greatest evolutionary progress occurred. Sixty-four species occur here and fifty-five are found nowhere else. All the twenty-two genera occur in the northern Pacific. In the southern hemisphere, where the temperature conditions are favorable to the growth of these algæ, as is shown by the prodigious size attained there by *Macrocystis*, and by its extreme abundance, only three genera occur containing but fourteen species, all but two restricted to the southern hemisphere. These species are probably descendants of forms that crossed the equator during the glacial period when the ocean had a much lower temperature in the tropical zone. That period has occurred in the southern hemisphere; at least it is shown by the failure of *Macrocystis* to cross into the northern Atlantic Ocean, where it would find a larger region admirably adapted for its growth.

These algæ attain the greatest length of any plant, *Macrocystis* reaching a length of 400 to 700 feet or over. Some of the forms, such as *Palagophycus* and *Nereocystis*, are annuals and must grow much faster than any other organisms in order to attain in the course of a few months their enormous length (100 to 200 feet or over).

The large size and high differentiation of tissues attained in this group, and especially the occurrence of well-marked species and very distinct genera, render it highly probable that sexuality occurs in spite of the prevailing opinion of algologists to the contrary.

The Flora of a Sphagnum Bog: C. E. WATERS.

An account was given of a sphagnum bog in Ann Arundel County, Maryland. The characteristic plants of the bog proper, of the low wet woods along the stream flowing through it, and of the surrounding dry woods, were shown to be of unusual botanical interest. In the dry woods *Quercus prinoides*, *Q. nana* and *Castanea pumila*, together with *Kalmia angustifolia*, *Vaccinia* and other heaths, are abundant. *Iris verna*, *Chrosperma muscætoxicum*, *Gaultheria*, *Rhus toxicodendron* and *R. radicans*, etc., are common. In the more open parts of the bog are found *Sar-*

racenia purpurea, *Drosera rotundifolia*, *D. intermedia*, *Eriocaulon decangulare*, *Utricularia* sp., *Castalia odorata* (in three or four inches of water), *Lycopodium adpressum* and *Blephariglottis cristata* have been found. Just below the bog is a shallow pond in which occur *Brasenia peltata*, *Potamogeton* sp., *Nymphæa advena*, *Castalia odorata*, and a rapidly increasing colony of *Marsilea quadrifolia* introduced six or eight years ago. Around its margin *Blethia* and several heaths are found. No *Isóetes* has ever been discovered, in spite of apparently ideal conditions. In the wet woods are very large colonies of *Woodwardia areolata*, *Nephrodium simulatum* and *Osmunda cinnamomea*, together with the form *glandulosa*, for which this is the type locality. *N. cristatum*, *N. boothi* and *N. spinulosum*, *Woodwardia virginica*, *Smilax walteri*, *Magnolia virginiana*, *Blephariglottis blephariglottis*, *Perularia flava*, and many other plants are found. In the rather swift stream with gravelly bottom *Vallisneria spiralis* is plentiful. Practically none of the common spring flowers usually found in low rich woods are known to occur there. Many other common plants are also missing, one of the most notable being *Equisetum arvense*, which is abundant along railroads, etc., in Baltimore County, but has not been seen in the region under discussion. The absence of *Typha* in the bog was especially noted, and in the discussion which followed the paper the fact was brought out that it is rarely if ever found growing with *Sphagnum*.

THE twenty-eighth regular meeting of the Botanical Society of Washington was held at the Portner Hotel, April 29, 1905. The following papers were presented:

Recent Results with the Use of Copper in City Water Supplies: KARL S. KELLERMAN.

The use of copper for eradicating algal pollution is now generally recognized as the most practical successful method of dealing with this troublesome phase of water engineering.

Copper has been proposed, also, as an agent for disinfecting water supplies contaminated with pathogenic bacteria, and considerable discussion has been aroused as to the advisability

of this application of the copper method, except in cases of extreme necessity. There are two ways of using copper as a water supply disinfectant. One plan is to treat the supply directly, in the reservoir if there be one, or at the intake gallery if the water be drawn from a lake or stream. In the latter case the treatment necessarily must be continuous. The second plan is to treat water before filtration. By the use of suitable chemicals, all the copper is precipitated and removed from the water by the subsequent filtration.

Albuquerque, N. M., and Columbus, O., are examples of the first plan of treatment. These two cities greatly reduced the number of typhoid cases during epidemic seasons, and the chemical examinations that were made failed to show copper in the water drawn from faucets of consumers.

Anderson, Ind., is an example of the second plan of treatment, and even with the filters laboring under structural defects¹ it seemed possible to remove all bacteria usually supposed to indicate sewage contamination.

Disease Resistance in Plants: W. A. ORTON.

The Occurrence of Extractives in Apple Skin:

HERBERT C. GORE.

HERBERT J. WEBBER,
Secretary.

THE PHILOSOPHICAL SOCIETY OF WASHINGTON.

THE 603d regular meeting was held May 27, 1905. The evening was devoted to papers on absolute electrical measurements with a description of the experiments now in progress at the Bureau of Standards.

Dr. K. E. Guthe spoke on the 'Methods and Apparatus Employed in the Absolute Measurement of Electric Current.' After a short introduction regarding the purpose of absolute electrical measurements, the speaker described and discussed the different methods and apparatus which have been employed for the absolute measurement of an electric current and—by the use of a known resistance—of the electromotive force of standard cells. The tangent galvanometer and similar methods are based upon the knowledge of the hori-

¹I am informed that these defects are now remedied.

zontal component of the earth's magnetic field and this can hardly be determined more accurately than to 1 in 2,000, except by the most refined methods. The different forms of current balance make use of the absolute value of gravity. In the electrodyndrometer methods the preliminary measurements include the determination of the elastic properties of the suspension. The electrodyndrometer which is being constructed at the Bureau of Standards was described more fully. Finally the results obtained for the electrochemical equivalent of silver were compared and the need for new determinations with reliable coulometers pointed out.

Professor E. B. Rosa presented 'The Methods and Apparatus Employed in the Determination of v , the Ratio of the Electromagnetic to the Electrostatic Unit of Electrical Measurement.' After a discussion of the older work the apparatus now in use by the speaker and Dr. Dorsey was described. A rapidly charged and discharged spherical condenser is inserted in one arm of a Wheatstone bridge and the galvanometer deflection brought to zero; the quantity which is regulated by hand is the number of charges per second. The resulting value of v seems to lie between 2.9964 and 2.9968×10^{10} cm.-sec.—a range of 1/5000.

In the discussion that followed Dr. Bauer put the precision of the determination of H , the earth's horizontal magnetic force, at 1/4000; an instrument may be sensitive to 1/20000, yet differ from another by 1/500; and Mr. Wead spoke of the disregard of the masterly research of Cornu on the velocity of light, in comparison with the results under less widely varied conditions of the brilliant American experiments.

CHARLES K. WEAD,
Secretary.

THE NEW YORK ACADEMY OF SCIENCES. SECTION
OF ASTRONOMY, PHYSICS AND CHEMISTRY.

THE regular monthly meeting of the section was held at the American Museum of Natural History, on Monday evening, May 15. The papers presented were as follows:

Relation between Ionization and Combustion in Flames: F. L. TUFTS.

This paper was a preliminary communication concerning work that is still in progress. The method employed in determining the electrical conductivity of a flame has been described in a previous paper (*Physikalische Zeitschrift*, 5 Jahrgang, No. 3, pp. 76-80), and some results of applying it to a study of combustion have been given in an extract published in the *Physical Review* (Vol. XX., No. 3, p. 186). The present paper gave the results of investigations carried on for the purpose of determining the influence, on the electrical conductivity of a gas flame, of mixing CO₂ or air with the illuminating gas before supplying it to the burner.

The results showed that for small flames, showing little carbon luminosity, the admixture of either CO₂ or air caused no marked increase in the electrical conductivity, the amount of gas consumed per second being kept constant. For very small flames the admixture of either caused a decrease in the conductivity. For large flames, however, the admixture of either CO₂ or air caused an increase in the conductivity, which continued until enough CO₂ or air had been added to destroy the carbon luminosity, when the conductivity was as much as twenty-five per cent. larger than for a flame consuming the same quantity of undiluted gas. Continuing the addition of CO₂ beyond this point caused a decrease in the conductivity until the flame was extinguished. Continuing the addition of air caused at first a slight decrease, until the inner blue cone became well developed, when the further addition of air caused an increase in the conductivity, the conductivity reaching a larger value than it had on the disappearance of the carbon luminosity.

The Rate of Recombination of the Ions in Air: L. L. HENDREN.

The experiments described were undertaken to determine by a somewhat new method the absolute value of the coefficient of recombination of ions in air and more especially its variation with the pressure. The ionizing agent was a very active solution of radium

chloride spread over the surfaces of two large parallel metal plates. By this means a very large ionization was obtained compared with that obtained by previous observers using the Röntgen rays. The results showed that as the pressure decreases the coefficient of recombination decreases with an increasing rate from a value of 5,500 at atmospheric pressure to 1,000 at 10 mm. pressure.

Radiation Pressure and Differential Tones:
G. B. PEGRAM.

It was pointed out that the differential tones heard on sounding loudly two tones of different pitch may be considered as arising from the radiation pressure of the sound waves acting on the ear-drum. While the question of radiation pressure, or the pressure on any surface that is reflecting or absorbing energy coming up to it, has not admitted of a general treatment, such a pressure, proportional to the energy per unit volume of the medium transmitting the energy has been shown theoretically to exist in many cases, and proven experimentally in some. In the case of sound waves the theoretical treatment of the pressure on a reflecting surface is not at present satisfactory (see Poynting, *Phil. Mag.*, April, 1905), but experimentally it has been measured by Altberg and shown by Wood in a striking manner by an experiment described in the *Physical Review*.

Now if two tones of different pitch are sounded together, beats ensue, so the amount of energy coming up to the ear varies periodically with the rise and fall in loudness of the resultant sound. But when the most energy is coming up to the ear, or when the sound is loudest, the radiation pressure on the ear-drum is greatest; when the energy coming up to the ear is least, or when the sound is faintest, the radiation pressure is least. The effect of this variation of pressure on the ear-drum will be to set it into vibration with a period equal to that of the beats, and so, if the beats are of proper frequency, cause the sensation of a tone of that frequency, that is, the differential tone of Helmholtz.

While this explanation of differential tones from the standpoint of radiation pressure has,

perhaps, the same mechanical basis as Helmholtz's explanation, it seems not amiss to approach it in this way. An attempt is being made at a mathematical treatment.

C. C. TROWBRIDGE,
Secretary.

DISCUSSION AND CORRESPONDENCE.

HIGHER AND LOWER.

TO THE EDITOR OF SCIENCE: In the *American Naturalist* for June, on page 413, L. J. C. takes exception to the custom of referring to animals as 'higher' and 'lower,' on the ground that these terms tend to give the student an idea that the vertebrate affinities lie in a direct chain, rather than forming a complicated, branching system.

This criticism will strike some as a little captious since the terms do not imply a direct connection, but merely that some animals are on a higher plane than others, just as the dwellers on the fifth floor of an apartment house are higher than those on the fourth floor. The terms generalized and specialized fail to convey the idea intended because a highly specialized animal may be low in the scale of life. The sloth is more specialized than the monkey, but it would naturally be termed a lower animal; thus though what we call the 'higher' animals are, as a rule, more specialized than the 'lower' forms, they are by no means invariably so. To revert to the apartment house it may be said that a family on the fifth floor might be related to one on the fourth and another on the sixth and yet, as a whole, the fifth floor people would be higher than those below.

F. A. L.

A DENIAL.

TO THE EDITOR OF SCIENCE: In a circular sent out by The Macmillan Company advertising one of their recent publications, the assertion is gratuitously made that I 'uphold Wallace's position.' Kindly allow me the space to deny the statement and to explain that it arose first from a misapprehension, which was later compounded by a clerical error—not mine.

HUBERT LYMAN CLARK.

SPECIAL ARTICLES.

THE FISHES OF PANAMA.

IN the Zoological Club of Indiana University in 1885 or 1886 President D. S. Jordan gave a résumé of the facts known at that time concerning the relation of the marine faunas on the two sides of Panama. It was jokingly remarked at that time that at the rate of progress the canal might be finished by 1900 and that zoologists would have to bestir themselves to record the faunas as they exist before the Panama canal would mix things up. It is now 1905 and the canal is not finished. In the meantime the marine faunas have been dealt with by

1. GREGORY, L. W.: 'Contributions to the Palæontology and Physical Geology of the West Indies,' *Quart. Journ. Geol. Soc.*, Vol. 4, 1895, pp. 255-312.

2. FAXON, WALTER: 'The Stalk-eyed Crustacea,' *Mem. Mus. Comp. Zool.*, Harvard College, Vol. XVIII., 1895, pp. 1-292.

3. GILBERT, C. H., and STARKS, EDWIN C.: 'The Fishes of Panama Bay,' *Mem. Cal. Acad. Sci.*, Vol. IV., pp. 1-226.

Gilbert and Stark's conclusions are that:

"The ichthyological evidence is overwhelmingly in favor of the existence of a former open communication between the two oceans, which must have been closed at a period sufficiently remote from the present to have permitted the specific differentiation of a very large majority of the forms involved." They found that 'of the 82 families of fishes represented at Panama all but 3 (Cerdalidæ, Cirhitidæ and Nematestiidæ) occur also on the Atlantic side of Central America; while of the 218 genera of our Panama list, no fewer than 170, are common to both oceans.' Fifty-four out of a total of 374, or 144 per cent., of the Pacific coast species are identical with Atlantic coast species.

I have just finished a consideration of the geographical distribution of the freshwater fishes of tropical America and Patagonia as applied to the Archihelenis-Archiplata theory of von Ihering. The details will appear in one of the volumes of the Hatcher reports of Princeton University. The evidence there collected indicates that the Pacific slope fauna